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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,093	03/22/2004	Paul Caprioli	SUN-P9699-MEG	3838

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EXAMINER
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MOLL, JESSE R

ART UNIT	PAPER NUMBER
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2181

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/807,093	<b>Applicant(s)</b> CAPRIOLI ET AL.	
	<b>Examiner</b> Jesse R. Moll	<b>Art Unit</b> 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

*[Signature]*  
**FRITZ FLEMING**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100  
12/11/2006

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 September 2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "the deferred buffer" in line 18. There is insufficient antecedent basis for this limitation in the claim. Further, claim 1 recites the limitation "resuming execution in execute ahead mode" in line 22. It is unclear whether the "execute ahead mode" refers to "execute-ahead mode" recited in line 3. Examiner suggests that the limitation read "resuming execution in the execute-ahead mode". Similar problems exist in claims 10 and 19.

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4. Claims 2, 3, 11, 12, 20 and 21 recite the limitation "the non-aggressive execution mode". There is insufficient antecedent basis for this limitation in the claims.
5. All remaining claims are rejected due to their dependence on indefinite parent claims.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chaudhry et al. (U.S. Patent Application Publication 2005/0081195 A1) herein referred to as Chaudhry.
8. Regarding claim 1, Chaudhry discloses a method for dynamically adjusting the aggressiveness of an execute-ahead processor, comprising: executing instructions in an execute-ahead mode (Execute-Ahead Mode 204; see fig. 2), wherein instructions that cannot be executed because of an unresolved data dependency are deferred, and

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other non-deferred instructions are executed in program order (see paragraph 39), and wherein if a non-data-dependent stall condition is encountered, the execute-ahead processor enters a scout mode (Scout Mode 208; see fig. 2; see paragraph 43), wherein instructions are speculatively executed to prefetch future loads, but results are not committed to the architectural state of the execute-ahead processor (see paragraph 43, last 3 lines); if an unresolved data dependency is resolved during the execute-ahead mode, executing deferred instructions in a deferred mode (see paragraph 40, first 5 lines); wherein if some instructions are deferred again during the deferred mode (see paragraph 12), the method further comprises, determining whether an amount of work accomplished during execute-ahead mode exceeds a predetermined threshold (if the previous condition is not met, the method need not include this step), if so, waiting for the deferred buffer to empty, and returning to normal execution mode, otherwise resuming execution in a execute ahead mode(the method need not include this step).

Note that paragraph 12 states "if some deferred instructions are again deferred..." This shows that there are situations that instructions are not deferred again. In this situation, the claimed method need not determine. The claim makes no mention of actions happening responsive to other actions or conditions, but merely states that these actions occur if certain conditions are met. The claim does not require these actions responsive to a condition, but merely make a conditional statement which is met by merely showing that the condition is false.

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9. Regarding claim 2, Chaudhry discloses the method of claim 1, wherein resuming execution in the execute ahead mode involves remaining in the deferred mode until all deferred instructions are executed and the execute-ahead processor returns to a normal execution mode (this determination is never made; see above regarding claim 1).

10. Regarding claim 3, Chaudhry discloses the method of claim 1, wherein resuming execution in the execute ahead mode involves resuming execution in a non-aggressive execute-ahead mode, wherein if a non-data-dependent stall condition is encountered, the execute-ahead processor does not enter the scout mode, but instead waits for the non-data-dependent stall condition to be resolved, or for an unresolved data dependency to return, before proceeding (this determination is never made; see above regarding claim 1).

11. Regarding claim 4, Chaudhry discloses the method of claim 1, wherein prior to executing instructions in execute-ahead mode, the method further comprises entering the execute-ahead mode (see paragraph 37, lines 1-3) by: issuing instructions for execution in program order during a normal execution mode (see paragraph 36); upon encountering an unresolved data dependency during execution of an instruction (see paragraph 37, lines 1-3), generating a checkpoint that can subsequently be used to return execution to the point of the instruction (see paragraph 38), and executing subsequent instructions in the execute-ahead mode (see paragraph 39).

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12. Regarding claim 5, Chaudhry discloses the method of claim 4, wherein if a launch point stall condition is finally resolved, the method further comprises using the checkpoint to resume execution in the normal execution mode from the launch point instruction (the instruction that originally encountered the launch point stall condition) (see paragraph 46).

13. Regarding claim 6, Chaudhry discloses the method of claim 1, wherein executing deferred instructions in the deferred mode involves: issuing deferred instructions for execution in program order (see paragraph 40, lines 1-5); deferring execution of deferred instructions that still cannot be executed because of unresolved data dependencies; and executing other deferred instructions that are able to be executed in program order (see paragraph 40, second half).

14. Regarding claim 7, Chaudhry discloses the method of claim 6, wherein if all deferred instructions are executed in the deferred mode, the method further comprises returning to a normal execution mode to resume normal program execution from the point where the execute-ahead mode left off (see paragraph 41).

15. Regarding claim 8, Chaudhry discloses the method of claim 1, wherein the unresolved data dependency can include: a use of an operand that has not returned from a preceding load miss; a use of an operand that has not returned from a preceding translation lookaside buffer (TLB) miss; a use of an operand that has not returned from

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a preceding full or partial read-after-write (RAW) from store buffer operation; and a use of an operand that depends on another operand that is subject to an unresolved data dependency (see paragraph 37).

16. Regarding claim 9, Chaudhry discloses the method of claim 1, wherein the non-data-dependent stall condition can include: a memory barrier operation; a load buffer full condition; and a store buffer full condition (see paragraph 43).

17. Claims 10-18 recite equivalent limitations as claims 1-9 respectively and are rejected under the same grounds.

18. Claim 19 recites equivalent limitations as claims 1 and 10 and is rejected under the same grounds of rejections.

19. Claim 20 recites equivalent limitations as claims 2 and 11 and is rejected under the same grounds of rejections.

20. Claim 21 recites equivalent limitations as claims 3 and 12 and is rejected under the same grounds of rejections.



### ***Response to Arguments***

Applicant's arguments filed 31 August 2006 have been fully considered but they are not persuasive. The amended limitations are addressed in the rejections above.

### ***Conclusion***

21. The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse R. Moll whose telephone number is (571)272-2703. The examiner can normally be reached on M-F 10:00 am - 6:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fritz M. Fleming can be reached on 571-272-4145. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jesse R Moll  
Examiner  
Art Unit 2181

JM 12/11/2006

  
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